WHAT IS CLAIMED IS:

1. A method for simultaneous detection and/or determination of a plurality of modified proteins in a sample, comprising:

a) contacting the sample under mild protein denaturation conditions with a plurality of first antibodies capable of binding to a specific target protein, the first antibodies being immobilized on solid support material, each first antibody being differentiable from others by a differentiation parameter, whereby the first antibodies bind to respective target proteins present in the sample;

b) removing unbound materials from the locus of the first antibodies;

c) contacting the materials from step (b) with one or more second antibodies, each of which is specific to a class or subclass of modified proteins or with a plurality of second antibodies, each of which is specific to a modified protein, so as to bind the second antibody or antibodies to modified proteins in the sample; and

d) detecting and/or determining a plurality of modified proteins in the sample.

2. A method according to claim 1, wherein up to 100 modified proteins are detected and/or determined.

3. A method according to claim 1 wherein the modified proteins are selected from phosphorylated proteins, glycosylated proteins, acetylated proteins, methylated proteins, ubiquinated proteins, and prenylated proteins.

4. A method according to claim 3 wherein the modified proteins are phosphorylated proteins.

5. A method according to claim 1 wherein the solid support material comprises a series of subsets of solid particles, each subset being distinguishable from other subsets in accordance with a particular property or characteristic.

6. A method according to claim 5 in which the solid particles are differentiable by specific color or emission spectra.

7. A method according to claim 5 in which the solid particles comprise spherical particles formed from non-porous glass, polystyrene or latex.

8. A method according to claim 1 in which the solid support material is a microchip, a plate having a multiplicity of wells, or a slide.

9. A method according to claim 1 wherein the materials from step (b) are contacted in step (c) with one or more second antibodies, each of which is specific to a class of modified proteins.

10. A method according to claim 9 in which the materials from step (b) are contacted in step (c) with a second antibody that is specific to a class of modified proteins.

11. A method according to claim 1 in which the materials from step (b) are contacted in step (c) with a second antibody that is specific to a subclass of modified proteins.

12. A method according to claim 1 in which the materials from step (b) are contacted in step (c) with one or more second antibodies specific to phosphorylated proteins.

13. A method according to claim 1 in which the materials from step (b) are contacted in step (c) with a plurality of second antibodies, each of which is specific to a modified protein.

14. A method according to claim 1 in which the materials from step (b) are contacted in step (c) with a plurality of second antibodies, each of which is specific to a phosphorylated protein.

15. A method according to claim 14 in which the proteins are selected from phosphorylated p38MAPK, phosphorylated IκBα, phosphorylated Erk2, phosphorylated JNK and phosphorylated Akt.

16. A method according to claim 1 in which the second antibodies are biotinylated antibodies.

17. A method according to claim 1 in which the modified proteins are detected and/or determined in step (d) by contacting the product of step (c) with a labeled moiety.

18. A method according to claim 17 in which the labeled moiety comprises a phycobiliprotein.

19. A method according to claim 17 in which the labeled moiety comprises a phycoerythrin.

20. A method according to claim 17 in which the labeled moiety comprises a conjugate of a labeled moiety with streptavidin.

21. A method according to claim 1 in which the sample is a cell lysate.

22. A method according to claim 1 in which the sample is contacted with a sulfate or sulfonate detergent in step (a).

23. A method according to claim 22 in which the detergent is sodium dodecyl sulfate.

24. A kit for simultaneous detection and/or determination of a plurality of modified proteins in a sample, comprising:

(a) a plurality of first antibodies, each capable of binding to a specific target protein, each first antibody being immobilized on a solid support material and each first antibody being differentiable from others by a differentiation parameter;

(b) one or more buffers for lysing and for washing cellular material samples to be assayed

(c) an assay buffer for conducting the assay, said buffer containing from about 1-10 mM of a sulfate or sulfonate detergent; and

(d) one or more second antibodies specific to classes or subclasses of modified proteins or to specific individual modified proteins.

25. A kit according to claim 24 wherein the solid support material comprises a series of subsets of solid particles, each subset being distinguishable from other subsets in accordance with a particular property or characteristic.

26. A kit according to claim 25 in which the solid particles are differentiable by specific color or emission spectra.

27. A kit according to claim 25 in which the solid particles comprise spherical particles formed from non-porous glass, polystyrene or latex.

28. A kit according to claim 24 in which the solid support material is a microchip, a plate having a multiplicity of wells, or a slide.

29. A kit according to claim 24 wherein the modified proteins are selected from phosphorylated proteins, glycosylated proteins, acetylated proteins, methylated proteins, ubiquinated proteins, and prenylated proteins.

30. A kit according to claim 24 wherein the modified proteins are phosphorylated proteins.

31. A kit according to claim 24 wherein the second antibodies comprise one or more antibodies that are specific to classes of modified proteins.

32. A kit according to claim 24 wherein the second antibodies comprise one or more antibodies that are specific to subclasses of modified proteins.

33. A kit according to claim 24 wherein the second antibodies are specific to phosphorylated proteins.

34. A kit according to claim 24 wherein the second antibodies comprise a plurality of antibodies, each of which is specific to an individual modified protein.

35. A kit according to claim 24 further comprising a labeled moiety.

36. In a process for simultaneously analyzing a sample for a plurality of modified proteins, the step of denaturing modified proteins comprising contacting the sample with a sulfate or sulfonate detergent, preferably in a concentration of about 1-10 mM, at a temperature of between about 4 and about 37 °C, and for a time of from about 2 to about 72 hours.

37. A process according to claim 36 in which the detergent is sodium dodecyl sulfate.